

We claim:

1. A screen system for removing debris from a flow channel, comprising:
  - (a) a screen frame having a porous bar grid that is located below an impermeable debris plate;
  - 5 (b) a rake having a plurality of fingers that fit between bars of the bar grid, the rakes being movable along the bar grid to clear the bar grid of debris; and
  - (c) an emergency discharge door located in the debris plate above the bar grid, the emergency discharge door being movable from a normally closed position to an open position in the event water in the flow channel rises above the screen grid.
2. The screen system of claim 1 wherein the emergency discharge door is hinged to the scraper frame on an upper edge of the emergency discharge door.
3. The screen system of claim 1 further comprising a movable actuator member extending from the emergency discharge door for opening and closing the emergency discharge door.
4. The screen system of claim 1 wherein the emergency discharge door is mounted on a downstream side of the debris plate.  
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5. The screen system of claim 1 further comprising:
  - (a) a hinge along an upper edge of the emergency discharge door, connecting the emergency discharge door to a downstream side of the debris plate;
  - (b) a lock brace mounted to the emergency discharge door for movement therewith;
  - 20 (c) a lock bracket mounted to the downstream side of the debris plate for engagement with the lock brace when the emergency discharge door is in the closed position; and

(d) a vertically oriented actuator member having a lower end that engages the lock brace and the lock bracket to secure them together, the actuator member being movable to release the lock brace and the lock bracket from each other.

6. The screen system of claim 5 wherein the lock brace and the lock bracket have mating  
5 holes and the actuator member has a pin that releasably inserts into the mating holes.

7. The screen system of claim 6 wherein the actuator member moves vertically to remove  
the pin from the mating holes.

8. A screen system for removing debris from a flow channel, comprising:

(a) a screen frame having a porous bar grid that is located below a debris plate; a rake having a plurality of fingers that fit between bars of the bar grid, the rakes being movable along the bar grid to clear the bar grid of debris;

(b) an emergency discharge door mounted on a downstream side of the debris plate above the bar grid, the emergency discharge door being movable from a normally closed position to an open position in the event water in the flow channel rises above the screen grid,

(c) a hinge along an upper edge of the emergency discharge door, connecting the emergency discharge door to a downstream side of the debris plate;

(d) a lock brace mounted to the emergency discharge door for movement therewith;

(e) a lock bracket mounted to the downstream side of the debris plate for engagement  
20 with the lock brace when the emergency discharge door is in the closed position;

(f) a vertically oriented actuator member having a lower end that engages the lock brace and the lock bracket to secure them together, the actuator member being movable to release the lock brace and the lock bracket from each other;

(g) the lock brace and the lock bracket have mating holes and the actuator member has a pin that releasably inserts into the mating holes; and

(h) the actuator member moves vertically to remove the pin from the mating holes.

9. The screen system of claim 8 further including a lever arm pivotably attached to the frame, wherein the actuator member is mounted to the lever arm so that rotating the lever arm causes vertical movement of the actuator member.

10. The screen system of claim 8 wherein the lock brace extends across a full width of the emergency discharge door and wherein the screen system further comprises:

(a) a second lock bracket mounted to the emergency discharge door for movement therewith on a side of the emergency discharge door opposite the first mentioned lock bracket; and

(b) a second actuator member having a lower end that engages the lock brace and the second lock bracket to secure them together, the second actuator member being movable in unison with the first mentioned actuator to release the lock brace and the second lock bracket from each other.

11. A method of filtering a fluid channel comprising the steps of installing in the fluid channel a screen system having an impermeable debris plate, a bar grid that is located below the debris plate, and a plurality of rakes having fingers that fit between bars of the bar grid, the method further comprising:

20 (a) providing an emergency discharge door in the debris plate;

(b) flowing a fluid through the screen system while the emergency discharge door is closed, whereby the bar grid filters debris from the fluid; and

- (c) opening the emergency discharge doors, if a level of fluid rises and flows over the debris plate due to blockage of the bar grid.
12. The method of claim 11 wherein the opening of the emergency discharge door is performed manually.
- 5 13. The method of claim 11 wherein the opening of the emergency discharge door is performed manually from an upper portion of the screen system.